NOTES.

MR. LLOYD GEORGE, the Minister of Munitions, stated in the House of Commons on June 17 that he had been in communication with the Secretary of State for War with reference to the appoinment of a small advisory body of men of science to advise the Government during the continuance of the war as to the fullest employment of all the resources of chemical and mechanical science and invention in aid of military operations. Such a committee, if rightly constituted, should be of service in expressing opinions upon suggested means of offence or defence, but what is wanted is a working department of the War Office to organise and use the scientific and expert knowledge of the country in much the same way as the medical forces have been organised by Sir Alfred Keogh. The leisurely consideration by an advisory committee of proposals placed before it is not appropriate to the times, which demand immediate action by an energetic head who will not only use consultants but also organise scientific men into a corps on special service either at the Front or at home. Until this is done, it cannot be suggested that science is being fully employed in the nation's needs. We referred last week to Mr. H. G. Wells's letter to the *Times* upon the need for the mobilisation of scientific and expert knowledge to match and overcome like forces arrayed against us by Germany. In a further letter to our contemporary (June 22) Mr. Wells outlines a responsible official bureau having the same constitution and functions as those of the working department suggested above. Such a bureau with a capable director could do for the neglected scientific forces of the country what has already been done for the fighting and the medical forces. By all means let advisory committees be appointed as suggested by Principal Griffiths and Prof. Armstrong, but it is of even greater importance to have a well-informed central office which understands how to make the best use of the specialised knowledge of men of science individually or collectively, and knows the resources of laboratories and institutions available for national service. Sir Thomas Rose, in a letter which appears elsewhere in this issue, has misunderstood Mr. Wells, and our article last week, when he suggests that purely scientific investigation with no definite practical purpose is being urged. Intensive work with a definite object is as much the province of the man of science as of the inventor, and our plea is that such work should be instituted if the nation is to obtain the fullest advantage from scientific men and methods.

MUCH anxiety for inventors seems to be felt in many quarters, the idea being that brilliant schemes and devices may possibly not receive sympathetic consideration from Government officials or their advisers. In reply to a question in the House of Commons on June 22, the Prime Minister stated that the technical branches of the Admiralty and the War Office have very complete facilities for examining not merely completed inventions, but promising suggestions which by the application of trained electrical, chemical, or mechanical skill may be made effective. Mr. Asquith also took the opportunity to acknowledge the very valuable assistance received from the Royal Society in this connection, saying that the society has contributed to the Government several important inventions which it would not be in the public interest to disclose. We have no fear that any really practical suggestion or effective weapon of warfare will be overlooked at the present time, but we need more than a sorting office and consultative committees if we are to ensure the utmost gain from the application of scientific knowledge to practical problems. In an efficient system, every man and every intellect should be used in work for which they are best adapted by training and attainment. It is for the Government to see that this principle is actively applied to the organisation of our scientific forces in order to hasten the country's triumph.

AN excellent suggestion was made at a special meeting of the Institution of Mechanical Engineers on June 11 (reported in the *Engineer* for June 18) to the effect that all gauges and special tools required in the manufacture of munitions should be constructed in a special factory and thence distributed to contractors. Gauge-making is a very special art, requiring highly skilled workmen and special tools and arrangements for finishing accurately very hard materials. Very few general factories are equipped for work of this kind, and to expect such to provide their own gauges means considerable delay, which could be avoided easily by carrying out the above suggestion. The proposal was well received by the meeting, and we trust that the Minister of Munitions will take early action to carry it into effect.

To further the output of war materials in London and the surrounding districts the Ministry of Munitions has authorised the formation of a body to be called the Metropolitan Munitions Committee. The committee comprises the presidents of the Institutions of Civil, Mechanical, and Electrical Engineers, other prominent members of the engineering professions, trades, and manufactures, and representatives of the public utility services in London. It also includes representatives of the London County Council and of the London Chamber of Commerce. The committee is at present engaged, with the help of the Ministry of Munitions, in dividing London into various districts with small local committees and managers in order to collect information of the possibilities of the districts, so that the committee may report to the Ministry in what way London can help. Until further notice, communications should be addressed to the hon. secretaries, Metropolitan Munitions Committee. Great George Street, S.W.

THE value of youth as a national asset forms the subject of the leading article in *Engineering* for June 18. All the resources of the nation must be concentrated upon the overthrow of the enemy, and, naturally, a great part of the burden and sacrifice must fall upon youth. At the same time, it is wise that each unit of the public should be chosen for that function for which he (or she) is best suited, not only by reason of physical qualities, but also by mental capability. In this matter, attention should be given not only to the rank and file of our Army, but also to the qualifications of the young officers who have been, and are being, enrolled in such large numbers. A great number, indeed the great majority, of university trained young men have, in their enthusiasm, entered the ranks, and play the part of the private, the corporal, or the sergeant. Could not their services have been more efficiently utilised in our factories at the present moment? The factories now engaged on the production of war munitions should have their staffs as well filled as formerly by such young men. Many technically trained youths have already been brought back from the front to return to their positions. It is almost self-evident that, in the future, if the enormous economic strain is to be met successfully, we must have increased brain-power behind the manufactures of this country, and there is certain to be a greater call for mental capacity and activity than in the past. There certainly ought to be firm guidance brought to bear on all willing recruits to decide in what capacity they shall serve, and this control should not only be regulated by the needs of the moment, but should also take account of the future. We owe it to posterity to conserve our youth as far as possible, so that when the present generation passes away, fitting successors may be available to take their places and to carry on the traditions of our country.

THERE is an admirable article in *La Nature,* June 12, giving an account of the making of anti-typhoid vaccine in France, at the famous institute of Val-de-Grâce. English doctors and pathologists have long known and honoured the names of three Frenchmen—Chantemesse, Vidal, and Vincent—who have done splendid work in this great field of protective medicine; and what France thinks of them may be judged from the fact that the French Institute has just divided between them the Osiris prize of 100,000 francs. The article, by M. Benoit-Bazille, is admirably illustrated, and is easy for everybody to read and understand. The vaccine is *polyvalent*: that is to say, it is a blend, made not from one but from many strains of *Bacillus typhosus,* from diverse sources. The vaccine is sterilised: that is to say, it contains no living elements, no living germs; the sterilisation is effected by the momentary use of ether. The enforcement of aseptic methods, at every stage in the making and putting-up of the vaccine, is of the utmost vigilance. A striking example is given, with a chart, of the value of this treatment, during September-October, 1914, in the Belfort command. It is only one of many examples; but it is pleasant reading. We read with pleasure, also, of the zeal shown in the work. "Nobody but those who have lived at the laboratory from September, 1914, to the early months of 1915, can have any idea of the activity which prevailed there, and of the indefatigable zeal of all, men and women, mobilised or voluntary workers—directors of laboratories, preparators, Red Cross ladies, hospital orderlies, all working together." The whole article is excellent; and we gladly commend it to our readers.

WE are glad to learn that Dr. H. McLeod, F.R.S., director of the Royal Society's Catalogue of Scientific Papers, who has been seriously ill for some time past, is now much improved, and has been able to leave home for the seaside.

THE annual general meeting of the British Science Guild will be held at the Institution of Electrical Engineers, Victoria Embankment, W.C., on Thursday, July 1, at 4 p.m., when the report of the year's work of the guild will be submitted. The chair will be taken by the president, the Right. Hon. Sir William Mather, P.C., and an address will be given by Sir William Ramsay, K.C.B., F.R.S.

THE sixty-seventh annual meeting of the Somersetshire Archæological and Natural History Society will be held at Taunton on Tuesday, July 20. The meeting will afford members of the society an opportunity of inspecting the museum and buildings at Taunton Castle, and to see the improvements and additions effected in the Castle since the society's diamond jubilee celebration at Taunton in 1908.

IN place of the usual long excursion to the provinces the Geologists' Association proposes to organise a series of day excursions from London between August 25 and September 5. Mr. W. Whitaker, the chief director, will be assisted by the president of the association (Mr. G. W. Young), and other geologists. These excursions will afford provincial members opportunities of visiting the numerous fine sections easily accessible from the metropolis. As opportunities arise attention will be directed to the causal connections between the geology and geography of the various localities. The series of excursions will form a fairly complete demonstration of the field geology and geography of the London district.

THE Glass Research Committee of the Institute of Chemistry has found that a glass such as that made from formula No. 10, recently published by the institute (see NATURE, April 15) and recommended for X-ray bulbs, does not give a green phosphorescent glow if it is made from approximately pure materials. The slight glow given is blue. In view of the fact that a green phosphorescence appears to be preferred by users of X-ray tubes, it seemed desirable to determine the conditions for obtaining this effect. It has been traced to the presence of manganese; and such a glass as No. 10 will give this green glow when manganese dioxide is added to the batch mixture in the quantities frequently used to correct the colour due to iron.

AN address delivered by the distinguished astronomer, M. Camille Flammarion, on German mentality in history, has been printed, together with an appeal to the United States on behalf of Belgium ("La Mentalité allemande dans l'histoire," by C. Flammarion; Paris: E. Flammarion, 1915; price 50 centimes). M. Flammarion takes a broad view of the world-war convulsing one small planet in an infinity of other and greater worlds, and represents it as a struggle between civilisation and barbarism. A section of interest to scientific readers is that in which he shows the German or Prussian traits of arrogance and brutality to have been recognised throughout history for nearly 2000 years. It can be no coincidence that Julius Cæsar, Velleius Paterculus, Seneca, Tacitus, Strabo, tell the same tale as Froissart in the Middle Ages. Prussians to-day, like the Prutzi of the tenth century, are ethnically Finno-Slavs. The dependence on ethnical bases of such different national characters as those of the French and the German should be worth full investigation.

HITHERTO the only evidence of Neanderthal or Mousterian man from Spain has been the small skull in the Royal College of Surgeons, which was discovered in a cavern at Gibraltar in 1848. A typical lower jaw has now been recognised by Drs. Hernández-Pacheco and H. Obermaier, who describe the specimen in Memoir No. 6 just published by the *Comision de Investigaciones Paleontológicas y Prehistóricas* at Madrid. The newly-described jaw was found in 1887 at a depth of about five metres in a bed of tufa deposited by a former extension of the small lake of Bañolas in northern Catalonia, about 23 kilometres N.N.W. of Gerona. It was associated with non-marine shells and fragments of plants, but with no remains of importance for determining its precise geological age. The specimen is completely fossilised, but so fragile that it cannot be reproduced as a plaster cast. It retains all the teeth, and seems to belong to a male about forty years old. The body of the bone is low and stout, as usual, without any prominent chin; the ascending ramus is broad, with a shallow sigmoid notch. The teeth are relatively large, and all except the last molar are much worn by mastication. The incisors are somewhat inclined forwards. The roots of the molars are unfortunately obscured, and their characters have not been determined by radiography.

A LIST has just been published of all pensions granted during the year ended March 31, 1915, and payable under the provisions of the Civil List Act, 1910. Among the pensions we notice the following relating to scientific services:—Mr. G. Coffey, in recognition of the value of his researches and writings on Irish archæology, 100*l.*; Mrs. J. E. Baker, in consideration of the services of her husband, the late Dr. Hugh Baker, in the investigation and treatment of sleeping sickness in Africa, 80*l.*; Mrs. C. E. Burch, in consideration of the value of the researches of her husband, the late Dr. G. J. Burch, in physics and physiology, 60*l.*; Miss A. H. Bollaert, in recognition of the contributions of her father, the late Mr. William Bollaert, to the study of history, archæology, and ethnology in Spain, Portugal, and South America, 50*l.*; Miss L. Hunting and Mr. F. C. Hunting (jointly and the survivor of them), in consideration of the services rendered to veterinary science and practice by their father, the late Mr. W. Hunting, 50*l.*; Mr. W. G. Wallace and Miss V. Wallace, in consideration of the scientific work of their father, the late Dr. A. R. Wallace, 50*l.* each; Dr. Charlton Bastian, in consideration of his services to science, 150*l.*; Mr. R. H. Rippon, in consideration of his contributions to natural history, and of his inadequate means of support, 100*l.*; Dr. Marshall Watts, in consideration of his scientific work, 75*l.*

THE President of the Board of Agriculture and Fisheries has appointed a Departmental Committee to consider and report what steps should be taken by legislation or otherwise for the sole purpose of maintaining and, if possible, increasing the present production of food in England and Wales, on the assumption that the war may be prolonged beyond the harvest of 1916. The Committee will be constituted as follows:—The Right Hon. Viscount Milner (chairman), the Lord Inchcape, the Right. Hon. F. D. Acland, Mr. C. W. Fielding, Mr. A. D. Hall, Mr. Rowland E. Prothero, Mr. J. A. Seddon, the Hon. E. G. Strutt, and Sir Harry C. W. Verney, Bart. The secretary of the Committee will be Mr. H. L. French, of the Board of Agriculture and Fisheries, to whom all communications should be sent. The Committee has been appointed for the specific purpose defined in its terms of reference; and it has been asked, should it find that additional powers are necessary, to report in time for legislation to be submitted to Parliament during the present session. Its functions are quite distinct from those of the Agricultural Consultative Committee appointed by Lord Lucas on the outbreak of War. The Consultative Committee is a permanent Committee, to which the Board refers many subjects connected with practical agriculture, and no alteration in its work or constitution is contemplated; it will continue to advise the Board throughout the duration of the war.

IT is very comforting to note that a strong committee appointed by the Institute of Chemistry and the Society of Public Analysts and Other Analytical Chemists has taken in hand the very important problem of the standardisation of chemical products with special reference to their purity for analytical purposes, and that it has published a booklet entitled "A List of Reagents for Analytical Purposes, with Notes indicating the Standards of Purity regarded as Necessary for Analytical Work." The committee suggests that manufacturers should add the letters A.R. (signifying Analytical Reagent) to those of their products which conform to this standard. This matter has been dealt with for many years past by the larger factories in Germany, and one cannot help but feel that the letters A.R. are scarcely an efficient substitute for the very imposing label which is affixed to similar products emanating from Berlin, and which bears, over the signature of Dr. Bischoff, a list of some half-dozen substances which are not present, and finally the statement, "Gehalt—99·99 per cent." However, a very definite step has been taken in the right direction, and the committee is to be congratulated on the manner in which it has tabulated the various analytical reagents, and has stated the tests by which the purity of each of them may be determined. It is sincerely to be hoped that manufacturers will fall in with this scheme and that they will see that their reagents conform in all cases with the standard required. It cannot be denied that the reason which, in the past, has caused chemists to rely upon German sources for their reagents is to be found in the absolute trustworthiness which could always be placed upon the products emanating from such firms as those of Kahlbaum or Merck. The English manufacturers have now the opportunity to show that equal trustworthiness can be placed on their products, and that the initials A.R. attached to their reagents imply that they are Absolutely Right.

THE *National Geographic Magazine* for May again publishes a valuable contribution to the study of the great war by two timely articles. Mr. H. G. Dwight writes on the gates to the Black Sea: the Dardanelles and the Bosphorus, and Mr. E. A. Grosvenor on Constantinople and Sancta Sophia. The letterpress is interesting, but it is little more than an accompaniment to a fine series of photographs which illustrate in an admirable way the difficult conditions under which the present campaign is being conducted.

So much has been written on the subject of eoliths and of the Piltdown skull, that, in the existing state of the very active controversy which is being conducted on these questions, it is, for the present, inadvisable to discuss them in these columns. Meanwhile, the attention of British archæologists may be directed to an important memoir, occupying sixty-three pages, contributed by M. M. Boule to the issue of *L'Anthropologie* for January–April, 1915. He sums up the latter question by remarking:—"Les documents de Piltdown sont malheureusement des documents incomplets. Leur interpretation est encore douteuse sur des points essentiels. Ils constituent, malgré tout, une découverte des plus importantes et des plus instructives."

IN a paper read before the Royal Society of Medicine (Pathological Section, May, 1915) Dr. Charlton Bastian directs attention to the use of tyrosine as an aid in the demonstration of the "de novo" origin of living organisms (see NATURE, December 14, 1914, p. 466, and January 22, p. 581). He finds that a 0·05 per cent. solution of tyrosine in the proportion of thirty drops to each fluid ounce of his culture fluids accelerates the appearance of the organisms. The tyrosine should be added *after* the culture fluids are ripe for examination, the mixture being examined after three to four weeks' further incubation subsequent to the addition. When added at the time of preparation of the culture tubes, this action was not observed.

THE additions to the menagerie of the Zoological Society of London during the month of May numbered 136, among which were four Siamese fighting-fish (*Betta pugnax*) from Siam, new to the collection. Having regard to the abnormal conditions under which we are now living it is gratifying to notice that while the receipts for admission during this year, up to the end of May, show a decrease of 1189*l*., as compared with the corresponding period in 1914, there is an increase of 266*l*., as compared with the corresponding period of the previous ten years.

IN the columns of the *Times* of June 17 especial attention was directed to the fact that a litter of pine martens, "one of the rarest animals of the British Isles," was taken on June 15 among the crags below Honister Pass, in the Lake District. "Cumberland," we were informed, "is not even mentioned in the text-books on Carnivora as one of the few counties in which the pine marten is still to be found." If this be so, then the text-books need revision, for Cumberland is one of the counties in which the pine marten may now most certainly be found, though even here it is rare.

DR. G. F. KUNZ, president of the New York Academy of Sciences, has in preparation a volume on "Ivory and Elephants," and asks us to appeal to such of our readers as may be able to help him for detailed measurements of the tusks of the mastodon, mammoth, and elephant. He requires the length of the tusk along the outside curve; the circumference taken at the middle; the circumference and diameter at the socket; and the length of the base within the socket. Dr. Kunz appears already to have collected all the available published records, and hopes for help now from those who may possess as yet unrecorded specimens. Any information will be gratefully accepted, and duly acknowledged, and should be addressed to him at 409 Fifth Avenue, New York.

Two papers which will be highly acceptable to ornithologists appear in *British Birds* for June. In the first of these Miss Maud D. Haviland records some brief notes on the breeding habits of the grey phalarope, which she had the good fortune to encounter at Golchika, on the river Yenesei, Siberia. Her notes, illustrated by some most excellent photographs, are confined to the incubation period, and show that while incubation is performed by the male alone, both sexes unite in the care of the young. Another point worthy of note concerns the coloration, which, though vivid in this species, when in the breeding dress, is yet highly protective. The second paper contains records of the recovery of a number of birds, ringed and released by members of the British bird-marking scheme. While most were recovered at or near the place of their birth, one or two had wandered far afield, as in the case of a song-thrush ringed as a nestling at The Fylde, Lancashire, on April 4, 1914, and recovered at Pontillado, Spain, on November 18. A whinchat, marked as a nestling at Ingleton, Yorkshire, on June 15, 1914, was recovered on October 4 at Loule, Portugal.

STUDENTS of magmatic differentiation in igneous rocks will find much to interest them in Mr. B. J. Jayaram's discussion of the charnockite series in south-west Mysore (Records, Mysore Geological Department, vol. xii., p. 77).

MR. H. SUTER, in Palæontological Bulletin No. 2 of the New Zealand Geological Survey, has revised the type-material of the Tertiary Mollusca of New Zealand, and the drawings prepared for F. W. Hutton's catalogues are now for the first time published. All such work tends to reduce to order the conflicting classifications that hamper stratigraphy in New Zealand.

Scientia, the international scientific review, contains in its May issue three articles by eminent politicians on the catastrophic state of Europe; but there is also an interesting review in French by M. P. Rudzki, of Cracow, on recent theories of the origin of continents, including the work of Messrs. Jeans and Love.

THE *American Journal of Science* for May, 1915 (vol xxxix., No. 223), contains several palæontological papers. We notice here one by Mr. E. W.

Shuler on a new Ordovician Eurypterid, *Stylonurus alveolatus,* from south-western Virginia. The species occurs in marine strata, and confirms Laurie's view that the habits of Stylonurus were littoral.

IT is especially appropriate at the present time to direct attention to Mr. W. Versfeld's illustrated thesis on "The geological structure of portions of German South-west Africa," which occupies nearly the whole of the March number (vol. xi., 1915) of the *South African Journal of Science.* The region studied extends from the Orange River south of Warmbad to the dolerites and Karroo Beds of Keetmanshoop in latitude 26° 30′ S. A sedimentary origin is assigned to the gneisses near the Ham River, which consist of very distinct layers, now highly quartzose, now dark with hornblende. Although a "passage" into granite is observable, the author hesitates to regard this as an igneous contact. The Dwyka conglomerate is clearly recognised near Dreihoek, though no striated pebbles have yet been found in it.

AN article on "The European Winter and the War," by Prof. Robert De C. Ward, of the Harvard University, has been reprinted in pamphlet form from the *Journal of Geography,* vol. xiii. It deals chiefly with the period from November 1 to January 31, and is the continuation of a previous article by the same writer entitled "The War and the Weather during the First Three Months of the Fighting," noticed in NATURE of February 4 (p. 625). Referring to the western and eastern theatres of war in winter, the author states that both have advantages and both have disadvantages from a military point of view, the western having higher temperatures, and consequently more rain, mud, and "slush," whilst in the eastern war zone there is the disadvantage of greater and more continuous cold, but the advantage of somewhat more settled weather. It is mentioned that it is in the eastern war zone that there has been the greatest suffering on account of the cold, and there the winter weather controls have been most marked. In the eastern zone mild weather spells have been accompanied by an immediate slackening of military operations owing to the difficulty of transport. The author, writing from the other side of the Atlantic, says:—"The fact that this war is being fought in the winter means hundreds of thousands of dollars to the manufacturers of winter supplies in the United States." Attention is directed to the greater importance of the weather on warfare to-day than in the past, and the matter of aeroplanes and airships is instanced.

IN the Proceedings of the Tokyo Mathematico-Physical Society for 1909 and 1913 Prof. Terada and Dr. Hasegawa discussed the possibility of the barometric gradient over a region subject to earthquakes being one of the contributory causes of their production. The latter also showed that in one such district in Japan when an earthquake occurs the barometric gradient is perpendicular to the line of a certain geological fault. In the Proceedings for March and April, 1915, Dr. Nakamura shows that in the case of fifty slight earthquakes which occurred in another district in 1904, the barometric gradients were nearly perpendicular to the line of seismic weakness previously calculated by Prof. Omori by grouping the epicentres. The relation between the barometric gradient, the stress it produces in the earth's crust, and the occurrence of earthquakes seems now well established.

A CONTRIBUTION to the theory of the gyroscope is communicated to the Proceedings of the Royal Society of Edinburgh, xxxv. (2), 14. Prof. Lamb's object is to obtain briefly the *intrinsic* equations of the gyroscope, and to show how they lead immediately to the solution of a number of problems. Apart from their uses as a basis of calculation, they have a simple interpretation which enables the author to foresee the general character of the motion in cases where the actual calculation would be difficult. It is, however, to be hoped that Prof. Lamb, in addition to the applications to the gyrostatic compass and the steadying effect on ships, will bear in mind that aeroplanes present pressing demands for systematical study. Even gyroscopic action of propellers opens up a wide field for research. It must be admitted that Prof. Lamb's interpretations are very neat and simple, and to the point. A study of the paper might enable an average student to attack an examination question on the subject in an intelligent manner. With the existing treatment such questions as a rule are only answered by copying.

Science for May 7 contains an interesting article by Dr. B. C. Hesse on the part played by the chemist in the industrial development of the United States. Dr. Hesse emphasises the fact that although public attention has since the beginning of the war been centred on the chemist mainly in connection with coal-tar dyes, the industry of these dyes forms only a very small part of the total manufactures in which chemistry plays a predominating part. The entire consumption of dyes in the United States represents only about fifteen million dollars, whilst other true chemical industries represent nearly 2500 millions of dollars of produce per annum. If several others be included which are not exclusively chemical, but rest largely on a chemical basis—for example, the steel and iron industries and petroleum refining—the value of this produce is more than doubled, and the total number of wage-earners engaged increased to nearly 6¾ millions. The part played by the chemist in the United States has been a very great one, and at the present time there are nearly ten thousand chemists in the country. If he has not done more "the fault largely rests with those in charge of many of the industrial enterprises requiring chemical knowledge in their exploitation, who fail absolutely in a chemical understanding of their own products, and are devoid of any sympathetic contact with chemistry and with chemical points of view."

FROM several agricultural stations in the country publications have recently been issued showing how the deficiency of potash supplies can to some extent be met by the farmer. It was shown at Rothamsted that the ashes of hedge trimmings were practically as rich as kainit, and could be used in its stead. Mr. C. T. Gimmingham, of the Horticultural Research Station, Long Ashton, Bristol, has now directed attention to the considerable amount of waste material from the saw mills, and has made analyses showing that this also yields a residue containing from 6 to 10 per cent. of potash (K_2O). Mr. Gimmingham points out that the wood scraps, sawdust, and shavings from planing machines, etc., are produced in enormous quantities in every sawmill in the country. Some of this material, and notably the sawdust, is saleable in certain localities, but the great bulk of it is available for conversion into ash. In many cases this is already done; the wood is used as fuel, either alone or mixed with coal, and the ash is then readily obtained. It is interesting to note that in these cases the flue dust also contains a considerable proportion of potash, in one case as much as 9 per cent. being found. From the fertiliser point of view the admixture of coal with the wood is a disadvantage, and in view of the fact that the pure ash is worth anything from 25*s*. to 50*s*. per ton as fertiliser, it is well worth considering whether greater economy could not on the whole be effected by leaving out the coal and using wood waste only for fuel.

OUR ASTRONOMICAL COLUMN.

COMET NOTES.—An ephemeris of comet 1915*a* (Mellish) is published in the *Astronomische Nachrichten,* No. 4802, being a continuation of that published in No. 4801. It gives the magnitude as 5·5 on July 2, the brilliancy decreasing steadily afterwards. The comet will be a conspicuous object in July for southern observers, but its large southern declination during that month renders it unfavourable for observation in higher latitudes. Fortunately the southern declination will rapidly decrease, and the comet will be again visible in these latitudes. Dr. Crommelin, writing in *Knowledge* for June, hopes that it may still be a naked-eye object. The orbit, he says, "shows a slight resemblance to that of comet 1748 II., which was seen only on May 19, 20, and 22, in 1748, so that the elements are not very well known. Identity of the two comets is perhaps just possible, but not probable." A continuation of the ephemeris of the periodic comet Tempel 2 is also printed in *Astronomische Nachrichten* No. 4802, giving positions down to the end of next August.

ORBITS OF ECLIPSING BINARIES.—No. 3 of the Contributions from the Princeton University Observatory contains an important study of the orbits of eclipsing binaries by Dr. Harlow Shapley. It may be remembered that it was in 1912 that new methods were introduced for the computation of the orbit of an eclipsing binary, and these have permitted the rapid development of this phase of double-star astronomy. It has now become possible, as Dr. Shapley remarks, to derive as much information concerning binary systems in general, and their bearing on stellar evolution, from the orbits of eclipsing variables as from spectroscopic binaries or visual doubles. These new methods and their development are due to Prof. Russell and Dr. Shapley, and the present publication gives briefly the theory underlying the methods, and exhibits in some detail how these methods are employed in dealing with the considerable variety of problems that arise. A preliminary report in 1912 dealt with the orbits of forty-four stars, and later the results for eighty-seven stars were published. The present discussion represents the complete investigation of practically all the material available up to the present time, and contains in final form the treatment of ninety eclipsing variables. Dr. Shapley for the last two and a half years has been using the equipment of the Princeton Observatory to add to the material, and has made about 10,000 light measures with the polarising photometer. This has been done to obtain complete light curves of interesting stars, to fill up gaps in published series of observations, and to correct existing light curves. In the arrangement of the text the author has, as far as possible, kept the tabular matter separate and brought this together in the appendix. On p. 124 he summarises some suggested investigations on eclipsing binaries, and points out lines along which further investigations are desirable and could be accomplished without serious difficulty.

THE VARIATION OF LATITUDE DURING 1914·0–1915·0.—Prof. Albrecht publishes, in the *Astronomische Nachrichten,* No. 4802, provisional results of the international service for the determination of the variations of latitude. Fortunately, the war has in no way disturbed the observations at the six stations, so that the determination of the path of the pole has been continued as on former occasions. The communication is accompanied by the usual chart showing the track of the pole for the period 1909·0 to 1915·0, indicating an increase of amplitude of swing since the latter end of the year 1913.

THE SOCIETY FOR PRACTICAL ASTRONOMY.—The April-May number of the Monthly Register of the Society for Practical Astronomy, Chicago, has just come to hand. While the astronomical observations published in it are very brief, dealing only with some observations of comets and a short report on the planetary and lunar section, attention is directed to the need of a new section which should have for its object the furthering, in all possible ways, of the teaching of elementary astronomy according to modern methods. The writer of this appeal, Dr. Mary Byrd, formerly director of Smith College Observatory, refers to a circular letter issued some years ago by the American Astronomical Society, in which it was stated:—"The society considered the deplorable ignorance of persons, otherwise intelligent, in regard to everyday phenomena of the sky, and the fact that astronomy lags behind the other sciences in adopting the modern method of laboratory work by the student." As a move in the direction of remedying this defect the author advocates a scheme of organised effort to make elementary astronomy a practical study, and calls on the great body of amateurs in America to enlist themselves in the new movement.

AIMING WITH THE RIFLE.

SO many people are now learning to shoot with the rifle that it is profitable to consider some of the difficulties they are likely to meet with. These difficulties become greater as the age of the learner increases, and they may be minimised or accentuated by the lighting of the range at which the learner practises. A discussion of the lighting of rifle ranges, which took place at the monthly meeting of the Illuminating Engineering Society on May 18, shows very clearly that the existing conditions place artificial obstacles in the way of the learner; and it may fairly be contended that these obstacles never would have arisen, and the path of the learner would have been considerably smoothed, if certain optical principles had been recognised and utilised. Mr. A. P. Trotter, who opened the discussion, gave a very clear account of the difficulties encountered by a man of middle age when he attempts to shoot at one of the many indoor